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**David et al.**

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(54) **CONTROLLED COOLING OF AN  
ELECTRONIC SYSTEM FOR REDUCED  
ENERGY CONSUMPTION**

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patent is extended or adjusted under 35  
U.S.C. 154(b) by 662 days.

This patent is subject to a terminal dis-  
claimer.

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CPC ..... **F28F 27/00** (2013.01); **G05B 15/02**  
(2013.01); **H05K 7/20836** (2013.01); **G05B**  
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(58) **Field of Classification Search**  
USPC ..... 700/276–278, 299–300; 165/201, 287  
See application file for complete search history.

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(57) **ABSTRACT**

Energy efficient control of a cooling system cooling an elec-  
tronic system is provided. The control includes automatically  
determining at least one adjusted control setting for at least  
one adjustable cooling component of a cooling system cool-  
ing the electronic system. The automatically determining is  
based, at least in part, on power being consumed by the  
cooling system and temperature of a heat sink to which heat  
extracted by the cooling system is rejected. The automatically  
determining operates to reduce power consumption of the  
cooling system and/or the electronic system while ensuring  
that at least one targeted temperature associated with the  
cooling system or the electronic system is within a desired  
range. The automatically determining may be based, at least  
in part, on one or more experimentally obtained models relat-  
ing the targeted temperature and power consumption of the  
one or more adjustable cooling components of the cooling  
system.

**8 Claims, 18 Drawing Sheets**

